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Subject: Determination of the Maximum Achievable Control Technology (MACT) Floor for Existing Medical Waste Incinerators that Incinerate General Medical Waste
EPA Contract No. 68-D1-0115; Work Assignment III-87
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The purpose of this memorandum is to define the MACT floor emission levels for existing medical waste incinerators (MWI's) that combust general medical waste and to discuss the methodology used to determine the MACT floor levels. These MACT floor emission levels are different from those presented in a September 15, 1995 memorandum because the inventory of existing MWI's has been updated based on new information. The MACT floor emission levels for new MWI's are presented in a separate memorandum.

Section 129 of the Clean Air Act as amended in 1990 requires the U. S. Environmental Protection Agency (EPA) to establish emission guidelines for existing MWI's that combust hospital waste, medical waste, and infectious waste. These guidelines must specify numerical emission limitations for the following pollutants: particulate matter (PM), carbon monoxide (CO), dioxins and furans (CDD/CDF), hydrogen chloride (HCl), sulfur dioxide (SO_2), oxides of nitrogen (NO_x), lead (Pb), cadmium (Cd), and mercury (Hg).

According to Section 129, the degree of reduction in emissions that is deemed achievable for existing MWI's shall not be less stringent than the average emission limitation achieved by the best performing 12 percent of units in a category. This requirement that the guidelines be no less stringent than certain levels of emission control currently achieved is referred to as the MACT "floor." Section 302(k) of the Act defines the term "emission limitation" as "... a requirement established by the State or Administrator which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis ..." Consequently, air quality permits and State

regulations were used to determine the MACT floors for each pollutant in each subcategory.

Consistent with the definitions of the Act, the MACT floors for existing MWI's were developed by determining the average emission limitations achieved by the best performing 12 percent of MWI's in each of three subcategories based on capacity: small MWI's, medium MWI's, and large MWI's.[1] A data base of existing MWI's along with the emission limitations each MWI is subject to was developed for the project.[2,3] This data base was used to calculate the MACT floors for each subcategory.

For each pollutant the MWI data base was sorted by subcategory, and within each subcategory by stringency of emission limit (most stringent to least stringent). For each pollutant, the emission limitations reported by the top 12 percent of units in each subcategory were averaged to determine the MACT floor levels. In many cases the number of MWI's for which emission limitations were reported was less than 12 percent of the population within the subcategory. To make up the difference, emission limitations for additional uncontrolled units were included. The emission limits for the uncontrolled units were based on the highest individual test run value obtained during the EPA emissions testing program.[4] The results of the calculations to determine the MACT floor levels for each subcategory are presented in Table 1 and are discussed in the following sections.

Small MWI's

Small MWI's are defined as units with waste charging capacities of less than or equal to 200 lb/hr. According to the MWI data base developed for the project, there are 1,118 MWI's in this subcategory. Therefore, for each pollutant, the 135 small MWI's with the most stringent emission limitations represent the top 12 percent of units in that category, and the averages of these emission limitations represent the MACT floor levels for each pollutant. More than 135 small MWI's reported emission limitations for PM and CO. However, for the remaining pollutants (CDD/CDF, HCl, SO_2, NO_x, and metals) the number of small MWI's reporting emission limitations was less than 135. For these pollutants, uncontrolled levels of emissions were averaged in for the number of MWI's needed to account for 12 percent of the total population of MWI's in the category (or 135 MWI's). For example, HCl emission limits were reported for only 91 small MWI's. Because this number is less than the 135 MWI's needed to calculate the MACT floor, it is assumed that the remaining 44 small MWI's are subject to emission limitations based on uncontrolled conditions. The uncontrolled emission limitation used is based on the highest individual test run value obtained during EPA's test program, which is 2,770 parts per million by volume (ppmv). Assuming that 44 small MWI's are subject to this emission limitation results in an average of 4,426 ppmv for the

TABLE 1. MACT FLOOR EMISSION LEVELS FOR ALL POLLUTANTS

MWI size category	Pollutants								
	PM, gr/dscf	CO, ppmv	CDD/CDF, ng/dscm	HCl, ppmv	SO_2, ppmv	NO_x, ppmv	Pb, μg/dscm	Cd, μg/dscm	Hg, μg/dscm
Small	0.086	156	39,775*	4,426*	472*	228*	47,208*	8,659*	29,863*
Medium	0.043	98	40,554*	589	534	242*	21,554*	4,123*	13,916*
Large	0.021	87	27,659*	101	180	267*	10,441*	1,962*	6,606*

*Where MWI's with limits were not sufficient to make up 12 percent of the total population within a subcategory, assumed the remaining units needed to make up the 12 percent have emissions limitations equivalent to the highest individual run value found in the EPA test program. Where this occurs, the category is said to have "no floor" for that particular pollutant. The values shown are not an indication of emissions.
These values are as follows:[3]

CDD/CDF = 40,969 ng/dscm
HCl = 2,770 ppmv
SO_2 = 46.39 ppmv
NO_x = 224.5 ppmv
Pb = 8,629 μg/dscm
Cd = 3,520 μg/dscm
Hg = 25,708 μg/dscm

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top 12 percent of MWI's in the small category. This emission level is the HCl MACT floor for small MWI's. The MACT floor emission levels for all pollutants are presented in Table 1.

Medium MWI's

Medium MWI's are defined as units with waste charging capacities of greater than 200 lb/hr and less than or equal to 500 lb/hr. According to the MWI data base developed for the project, there are 696 MWI's in this subcategory. Therefore, for each pollutant, the 84 medium MWI's with the most stringent emission limitations represent the top 12 percent of units in that category, and the averages of these emission limitations represent the MACT floor levels for each pollutant. More than 84 medium MWI's reported emission limitations for PM, CO, HCl, and SO_2. However, for the remaining pollutants (CDD/CDF, NO_x, and metals) the number of medium MWI's reporting emission limitations was less than 84. For these pollutants, uncontrolled levels of emissions were averaged in for the number of MWI's needed to account for 12 percent of the total population of MWI's in the category (or 84 MWI's). The uncontrolled emission limitations used are based on the highest individual test run values obtained during EPA's test program. The MACT floor emission levels for all pollutants are presented in Table 1.

Large MWI's

Large MWI's are defined as units with waste charging capacities of greater than 500 lb/hr. According to the MWI data base developed for the project, there are 548 MWI's in this subcategory. Therefore, for each pollutant, the 66 large MWI's with the most stringent emission limitations represent the top 12 percent of units in that category, and the averages of these emission limitations represent the MACT floor levels for each pollutant. More than 66 large MWI's reported emission limitations for PM, CO, HCl, and SO_2. However, for the remaining pollutants (CDD/CDF, NO_x, and metals) the number of large MWI's reporting emission limitations was less than 66. For these pollutants, uncontrolled levels of emissions were averaged in for the number of MWI's needed to account for 12 percent of the total population of MWI's in the category (or 66 MWI's). The uncontrolled emission limitations used are based on the highest individual test run values obtained during EPA's test program. The MACT floor emission levels for all pollutants are presented in Table 1.

REFERENCES

1. Memorandum from S. Shoraka-Blair, MRI, to R. Copland, EPA/CG. January 31, 1996. PM MACT floor emission levels for potential subcategories of the MWI source category.

2. Memorandum from B. Strong, MRI, to R. Copland, EPA/CG. September 15, 1995. Data base of Existing Medical Waste Incinerators.

3. Memorandum from B. Strong and B. Hardee, MRI, to R. Copland, EPA/CG. January 31, 1996. Updated medical waste incinerator data base.

4. Memorandum from S. Shoraka, MRI, to Project File. July 28, 1992. Manual data base for all EPA tests.